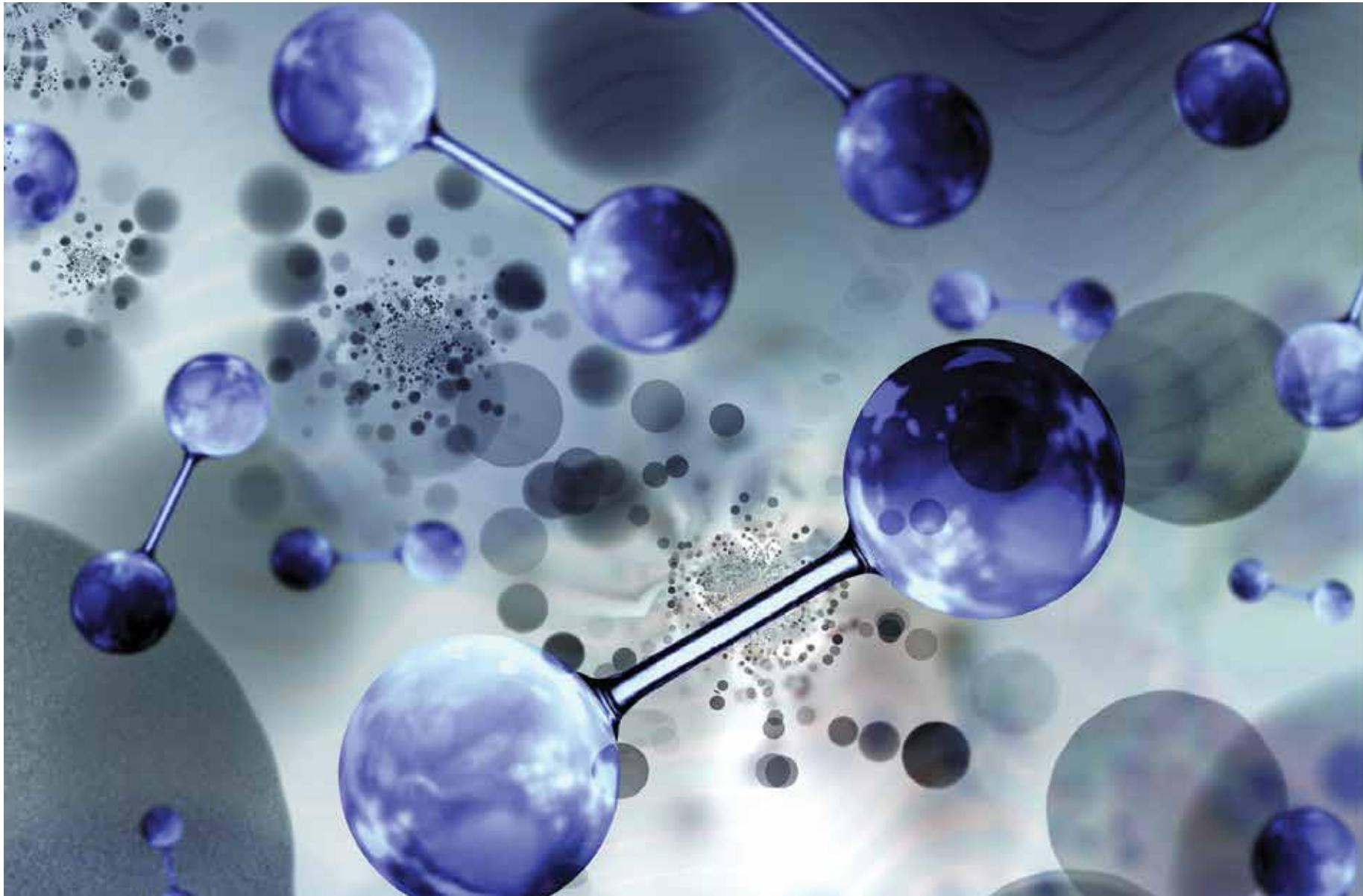


## Electric, Hybrid, & Hydrogen Vehicles Policy Briefing



The Hydrogen Strategy of Canada is a welcome first step, but should acknowledge that universities and federal scientists should not exist solely to serve industry, writes Aimy Bazylak. Photograph courtesy of Pixabay

# Is Canada's war on hydrogen finally over?

Canada is well-positioned to thrive with a hydrogen strategy because Canada is simmering with hydrogen.

Aimy Bazylak

Opinion



In 2020, Canada announced its Hydrogen Strategy, timely in the critical need to dramatically change the business-as-usual approach to harnessing, distributing, and using our energy resources in the face of extreme weather conditions and global warming caused by human activities.

Green hydrogen can be produced via water electrolysis powered from renewable energy, particularly during times of excess energy, and used for zero-emission power generation with fuel cells on-demand. Every day, energy and water security are at risk while we depend on

conventional energy infrastructure—so, it's about time Canada backed hydrogen and fuel cells! We are well-positioned to thrive with a hydrogen strategy, for Canada is simmering with hydrogen, fuel cell, and electrochemical expertise across the country—from academia to industry.

Internationally, Canada has a reputation for being a powerhouse for scientific and industry leadership in hydrogen and fuel cells. This is not a new development: the Electrolyzer Corporation (later renamed Stuart Energy Systems and later acquired by Hydrogenics) was founded in 1948 by University of Toronto alumnus Alexander T. Stuart; Ballard Power Systems has achieved major breakthroughs in fuel cells since the 1980s.

We've had some ups and downs over the years. In 2006, the National Research Council Institute for Fuel Cell Innovation (NRC-IFCI) officially opened—a fabulous facility teeming with the brightest and best scientists driving hydrogen and fuel cell technology forward—supporting Canada's leadership in academia and industry, state-of-the-art research labs, hydrogen refuelling, you name it. In the same year, *An Inconvenient Truth* was released, a documentary written by Al

Gore educating people about global warming.

In 2007, the Intergovernmental Panel On Climate Change (IPCC) released its 4<sup>th</sup> Assessment Report, and that year the Nobel Peace Prize was awarded jointly to the IPCC and Al Gore for their work to disseminate knowledge about man-made climate change. I was in the middle of my PhD studies on fuel cell technologies, and what could be a better and more exciting time to see this technology transform our energy infrastructure and combat anthropogenic climate change?

We were living in a time of change! Then suddenly, in 2009 the U.S. Energy Secretary Steven Chu proposed slashing spending on hydrogen energy by 60 per cent (from \$168-million to \$68-million) and cutting funding entirely for work on hydrogen vehicles. The ripples were felt around the world. Canada had caught a cold from our neighbour's sneeze. Many felt Canada had launched a “war on science” and scientists marched in response to Budget Bill C-38 that eliminated funding for federal science positions and research labs across the country.

The NRC Institute for Fuel Cell Innovation was re-organized, and fuel cell and hydrogen research was largely abandoned. Hydrogen

and fuel cells—these concepts were akin to “He-Who-Must-Not-Be-Named” in Harry Potter. If you were an academic researcher working in fuel cells and hydrogen, you had better figure out how to keep your research alive without using the words “fuel cells” or “hydrogen” in your grant proposals, or move onto a different topic completely. So, in 2020 when Canada released the Hydrogen Strategy for Canada, there was understandably a bit of surprise, trepidation, and hope, all mixed.

So, is Canada doing enough to support hydrogen and fuel cells? The Hydrogen Strategy of Canada is a welcome first step. The strategy is mostly focused on the vision of industry growth in Canada, though acknowledging under Pillar 3: Innovation that collaboration is needed across federal labs, industry, and academia. The strategy plans to attract new young talent to the sector through industry/academic collaborations, industry sponsored student competitions, and internships and co-op placements. Great things come when scientists work with industry, but the strategy should also acknowledge that universities and federal scientists should not exist solely to serve industry. Scientists need to focus on discovery, even if that means that the knowledge and

technology they produce may not be commercializable in the next five years. Canadian researchers need sustained resources to work on a range of technology readiness level (TRL) research—from fundamental to commercial and to ensure a pipeline of young talent to the workforce—all needed to build international leadership. We need to think bigger than just the next five years.

Industry needs to focus on now, and universities have a lot to offer to accelerate commercial adoption. However, if scientists aren't encouraged to think blue sky and think bigger than the next five years, then who will? We must ask ourselves, when it comes to hydrogen and fuel cells, does Canada want to lead or does it want to follow?

Professor Aimy Bazylak is the Canada Research Chair in Thermofluids for Clean Energy and professor in the Department of Mechanical and Industrial Engineering at the U of T where her clean energy research is focused on fuel cells, water electrolyzers, and carbon dioxide reduction. She was recently named a Helmholtz International Fellow (Germany), elected to the Royal Society of Canada College of New Scholars, Artists and Scientists, and elected as a 2022 Fellow of the Engineering Institute of Canada.

The Hill Times